



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,004	01/19/2006	Tsuyoshi Uehara	Q92479	5166
23373	7590	11/15/2007		
SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			EXAMINER CHEN, KEATH T	
			ART UNIT	PAPER NUMBER
			1792	
			MAIL DATE	DELIVERY MODE
			11/15/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/565,004	Applicant(s) UEHARA ET AL.	
	Examiner Keath T. Chen	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 October 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) 13-26 and 28-36 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10/25/2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

Amendment on drawings filed on 10/25/2007 is accepted.

The claim amendment filed on 10/25/2007, addressing rejection of claims 1-12 and 27 from the first office action (07/25/2007), is acknowledged and will be addressed below.

Election/Restrictions

1. Applicant's confirmation of election without traverse of group IA drawn to plasma electrode structure, claims 1-12 and 27 and withdrawn claims 13-26 and 28-34, in the reply filed on 10/25/27, see page 18, is acknowledged. Furthermore, the newly added claim 35 and 36 belong to species IB because they address gas guide. Applicant request of rejoining claims 13-26 and 35-36 is denied because the lack of unity of invention as evidenced by the claim rejection of claim 1-12 and 27 discussed below.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Lines 5-6 and similarly in 9-11: "... including a plurality of electrode members each ... shorter than a length of said workpiece ..." failed to distinctly claim the subject matter because infringement depends on object worked on.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
3. Claims 1-6, 11-12, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perrin et al. (US 6281469, hereafter '469).

'469 teaches some limitations of:

Claim 1: A plasma processing apparatus (col. 2, lines 29-34) for plasmatizing a processing gas in a discharge space and jetting the plasmatized gas (col. 10, lines 64-66) so as to be contacted to a workpiece (col. 1, lines 29-31) to be processed, apparatus comprising: a first electrode row including a plurality of electrode members

(Fig. 15, row #12A) and extended in one direction shorter than a length of said workpiece and arranged in a line in the extending direction, said first electrode row as a whole having a length corresponding to that of said workpiece (see Fig. 21); a second electrode row (Fig. 15, row #12B) including another plurality of electrode members and extended in the extending direction shorter than the length of said workpiece and arranged in a line parallel with said first electrode row, said second electrode row as a whole having a length corresponding to that of said workpiece; one of said electrode members of said first electrode row and one of said electrode members of said second electrode rows, which are arranged in substantially same positions in the extending direction, having opposite polarities and forming a row-to-row partial gap therebetween, said row-to-row partial gap serving as a part of said discharge space(col. 9, lines 1-4), one of said polarities being an electric field applying pole, the other of said polarities being a grounding pole (col. 6, lines 50-55, one of the electrode can be connected to ground); and a row-to-row gap including said row-to-row partial gap between said first and second electrode rows, said row-to-row gap having a length corresponding to that of said workpiece.

Claim 2: those of said electrode members constituting said electric field applying pole being connected to different power sources, respectively (col. 6, lines 56-58).

Claim 3: only those of said electrode members constituting said electric field applying pole being connected to a common power source (col. 6, lines 56-58).

Claim 4 (besides claim 1): a first electrode row (row #12A, Fig. 15) including a plurality of electrode members and extended in one direction and arranged in a line in

the extending direction; a second electrode row (row #12B) including another plurality of electrode members and extended in the extending direction and arranged in a line parallel with said first electrode row; and two of said electrode members of each of said electrode rows arranged adjacent to each other in said extending direction being opposite in polarity with respect to each other (as shown in Fig. 15).

Claim 5: an in-row gap is formed (Fig. 15, the vertical gaps) between two of said electrode members arranged adjacent to each other in said extending direction in said first electrode row and/or said second electrode row, said in-row gap also forming a part of said discharge space.

Claim 6: one of said two electrode members includes a first surface (Fig. 15, top line of the first electrode of row #12B, facing #12A) forming said row-to-row gap and a second surface (the face that facing right) disposed at an angle (right angle) with respect to said first surface, and the other of said two electrode members (the second electrode of row #12B, grid patterned) includes a third surface (the face facing #12A) generally flush with said first surface and forming said row-to-row gap and a fourth surface (the face facing left) placed opposite to said second surface and arranged at an angle (straight angle) with respect to said third surface, said in-row gap being formed between said second surface and said fourth surface.

Claim 11: an introduction port (Fig. 20, #28) of the processing gas communicated with a side in a direction orthogonal to the extending direction of said row-to-row gap, a jet port (#23) communicated with a side opposite to the introduction port of said row-to-row gap; and two of said electrode members of each of said electrode rows arranged

adjacent to each other in said side-by-side arranging directions being same in polarity with respect to each other (col. 6, lines 8-11, periodicity can be omitted if desired).

Claim 12: said polarities include an electric field applying pole and a grounding pole (col. 6, lines 50-55, one of the electrode can be connected to ground), and an insulating partition wall (#24, spacer, Fig. 20, an enlarged view of Fig. 9) is interposed between two of said electrode members having said electric field applying pole which are adjacent to each other in said extending arranging direction.

Claim 27: A plasma processing apparatus for introducing a processing gas into a discharge space from an introduction port (Fig. 20, #28), plasmatizing the gas in said discharge space and jetting the plasmatized gas through a jet port (#23) so as to be contact to a workpiece to be processed, said apparatus comprising: a first electrode row consisting of a plurality of electrode members and extending in one direction (horizontal direction in Fig. 20) and arranged in a line in the extending direction intersecting with a flowing direction toward said jet port from said introduction port (vertical direction in Fig. 20), a second electrode row consisting of another plurality of electrode members and extending in the extending direction and arranged in a line parallel with said first electrode row; one of said electrode members of said first electrode row and one of said electrode members of said second electrode rows, which are arranged at a first position in said extending direction, having opposite polarities (grounding pole is an opposite polarity, as defined at the later part of this claim) and forming a first row-to-row partial gap therebetween, said first row-to-row partial gap serving as a part of said discharge space, and another of said electrode members of said first electrode row and another of

said electrode members of said second electrode rows, which are arranged at a second position adjacent to said first position, having opposite polarities with each other and forming a second row-to-row partial gap herebetween, said second row-to-row partial gap serving as another part of said discharge space, said electrode member which is arranged at the first position in said first electrode row and said electrode member which is arranged at the second position in said first electrode row having opposite polarities each other and forming an in-row gap therebetween, one of said polarities being an electric field applying pole, the other of said polarities being a grounding pole (above 20 lines substantially the same as discussed in claims 1 and 4 rejection above); and said apparatus further comprising an introduction part (#27 and #28, together) having said introduction port (#28) that includes a row-to-row introduction port (one of the opening facing a gap) disposed astride said first row-to-row partial gap and said second row-to-row partial gap (viewing from Fig. 15, a horizontal line) and an in-row introduction port directly connected to said in-row gap (#27 distribute gas to both row-to-row gas and in-row gap, see Fig. 15 as top view of Fig. 20).

'469 does not explicitly teach the limitations of:

Claims 1, 4, 11, and 27: (the first and the second electrode rows each having a plurality of electrode members) each being elongate.

'469 discloses the claimed invention except for the shape of electrode member being square instead of rectangular. It would have been an obvious matter of design

choice to alter the shape of electrode members, since such a modification would have involved a mere change in the shape of a component. A change of shape is generally recognized as being within the ordinary level of skill in the art. In re Dailey, 357 F.2d 669, 149 USPQ 1966.

4. Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over '469, further in view of Koga et al. (US 6518990, hereafter '990).

'469 teaches all limitations of claim 6, as discussed above. '469 also teaches various configurations of two-dimensional electrode arrays, including triangular arrays where the in-row gap is at non right-angle to row-to-row surface (Fig. 15-17, col. 9, lines 7-9) are suitable.

'469 does not teach the limitation of:

Claim 7: said first surface and second surface form an obtuse angle and said third surface and fourth surface form an acute angle, said in-row gap being in a slantwise relation with said row-to-row gap.

Claim 9: said electrode row on the opposite side of said electrode row having said first surface, said electrode member located in the substantially same position as said electrode member having said first surface is arranged astride said first surface and the end face of said third surface.

'990 is an analogous art in the field of apparatus which utilizes plurality of electrodes to form charge on the substrate (abstract, Fig. 5), particularly in providing various electrode array arrangement (summary of the invention, col. 3, lines 8-44) for

the purpose to achieve uniformity (col. 4, lines 19-26, '469, col. 13, lines 2-4). '990 provides a trapezoid electrode array (Fig. 16) having stable application of charge. Such trapezoid electrode array met the limitation of claim 7 and 9.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have combined '990 with '469. Specifically, to have incorporate the electrode array arranged as taught in Fig. 16 of '990 into the electrode array of Fig. 15-17 of '469, for the purpose of achieving uniformity and stable application, with a reasonable expectation of success.

Further, '469 discloses the claimed invention except for the shape of the electrode. It would have been an obvious matter of design choice to have altered the shape of electrode from the various shapes already disclosed in '469, since such a modification would have involved a mere change in the shape of a component. A change of shape is generally recognized as being within the ordinary level of skill in the art. In re Dailey, 357 F.2nd 669, 149 USPQ 1966.

For claim 8, '469 further teaches the rounding of electrode surface (for example, Fig. 12).

'990 further teaches the limitation of claim 8:

Corners on the side of the obtuse angle formed between said first surface and second surface are R-chamfered with a relatively large radius of curvature, while comers on the side of the acute angle formed between said third surface and fourth surface are R-chamfered with a relatively small radius of curvature (col. 4, lines 48-56).

The rounding of corners has two possible results: one corner having a larger radius or a smaller radius than the other corner. '469 discloses the claimed invention except for rounding of corner. It would have been an obvious matter of design choice to vary the shape of corners, since such a modification would have involved a mere change in the shape of a component. A change of shape is generally recognized as being within the ordinary level of skill in the art. In re Dailey, 357 F.2nd 669, 149 USPQ 1966.

'469 also teaches the limitation of claim 10:

The downstream end of said in-row gap is open in such a manner as to be able to jet a processing gas therefrom and without passing the processing gas through said row-to-row gap (Figs. 18-20 show the jetting portion is more open than the gas introduction port, therefore, processing gas formed in the in-row gap can flow downward directly).

Response to Arguments

Applicant's arguments filed on 10/25/2007 have been fully considered and will be addressed below:

5. Applicant's corrected figures 1-3 and 20-24 overcome 37 CFR 1.84(p)(5) objection.
6. In regarding to USC 112 2nd paragraph rejection of claim 27, see page 19, applicant's amendment overcome this rejection.

7. In regarding to 35 USC 102(b) rejection of claims 1 and 11 based on Okui ('979), see pages 21-22, the amended claims overcome the 102(b) rejection.

8. In regarding to 112 2nd paragraph rejection of claim 1, see page 19, applicant's argument based on MPEP 2173.05(b), see page 19, is found not persuasive. The instant case is considered similar to the bicycle example, cited in 2173.05(b), which depends on a rider of unspecified build (analogous to the unspecified size of piece worked on in claim 1), Ex parte Brummer, 12 USPQ2d 1653 (Bd. Pat. App. & Inter. 1989). The wheelchair example is not analogous to the instant application because wheelchair is built to fit each of a diversity in the size of automobiles while the current apparatus is not built to fit each size of workpiece.

9. In regarding to 35 USC 102(b) rejection of claims 1-6, 11-12, and 27 based on Perrin et al. ('469), see page 20, third paragraph, applicant arguments are not persuasive.

Applicant's argument is that the amended claims require an elongate sub-electrodes and a grounding pole, see page 20, third paragraph. The grounding pole is disclosed in '469, col. 6, lines 50-55 and the change of shape is prima facie obvious, as discussed in claim rejection above.

Applicant's further argument, 4th and 5th paragraphs, of '469 teaches different potentials, not opposite polarity. However, in amended claim 27, applicant set forth one of the many possible definitions of "opposite polarity" being grounding pole and electric field applying pole, contradictingly arguing that two potentials can be "opposite polarity".

Applicant's further point out the lack of clear definition in the instant application on the term "opposite polarity" when apparatus has more than two electrodes.

The amended claims 1-6, 11-12, and 27 based on '469 are now USC 103(a) due to amended claims requires an obvious change in shape of sub-electrodes.

10. In regarding to 35 USC 103(a) rejection of claims 7-10, see page 22, is based on the patentability of claim 4. Since claim 4 is rejected as discussed above, the dependent claims 7-10 are also rejected.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keath T. Chen whose telephone number is 571-270-1870. The examiner can normally be reached on M-F, 8:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

kc

KC


MICHAEL CLEVELAND
SUPERVISORY PATENT EXAMINER